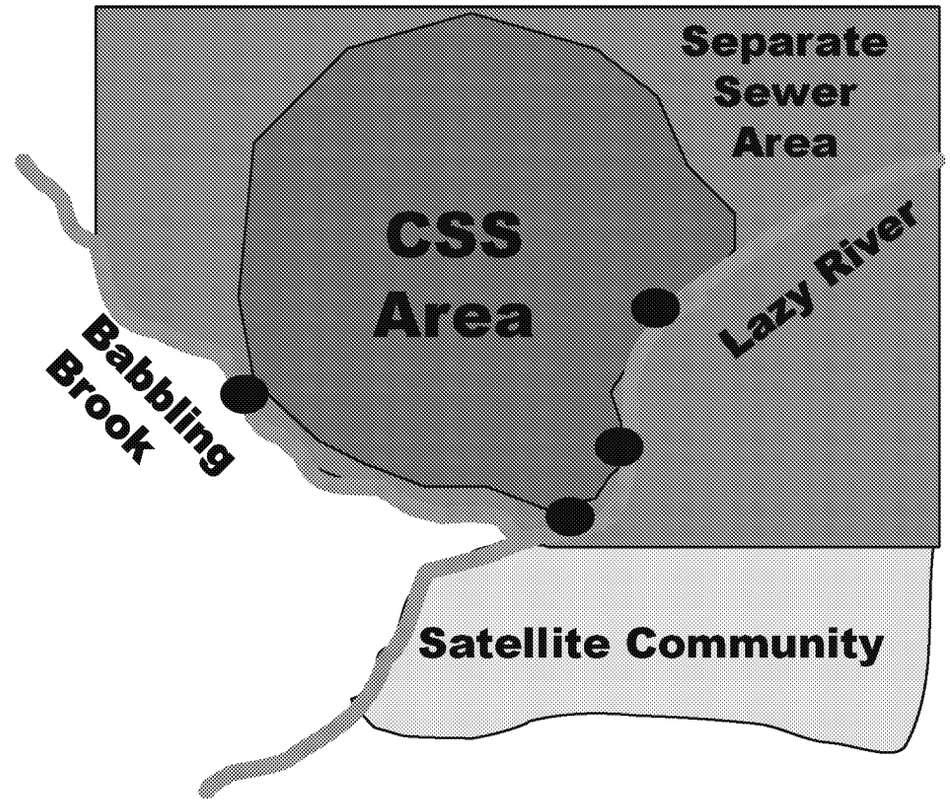
Physical Characterization

Physical Characterization cont.

- Typically includes:
  - Delineation of CSS area and sewersheds
  - Locating CSO outfalls, regulator structures, the WWTP, and pump stations
  - Estimating land use and impervious cover, by sewershed
  - Showing layout of major interceptors
  - Identifying hydraulic capacities for the WWTP, CSO regulators, and pump stations
  - Identifying CSO receiving waters
  - The written component of physical characterization in an LTCP usually includes a variety of maps and figures.

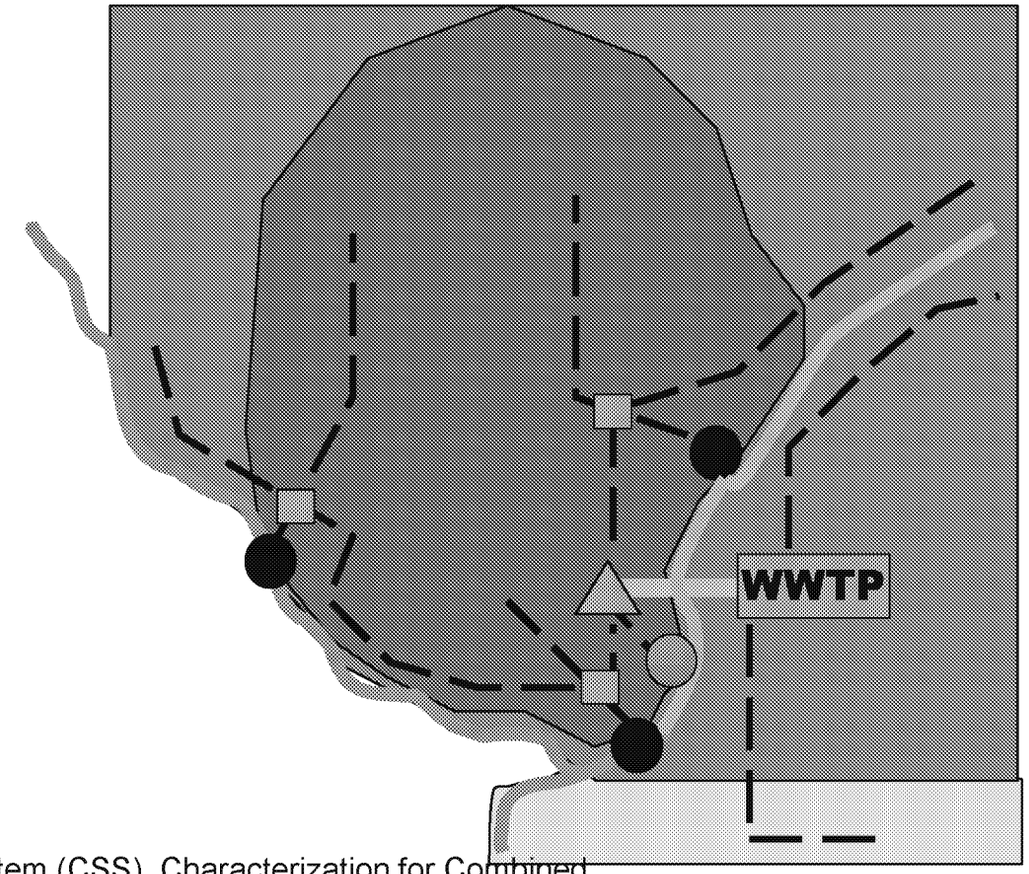
Physical Characterization of Springfield, USA

- Let's introduce Springfield, USA as our example community
- Springfield has a CSS with four outfalls that discharge to two separate receiving waters, Babbling Brook and Lazy River
- Springfield also has a separate sewer area and a satellite community

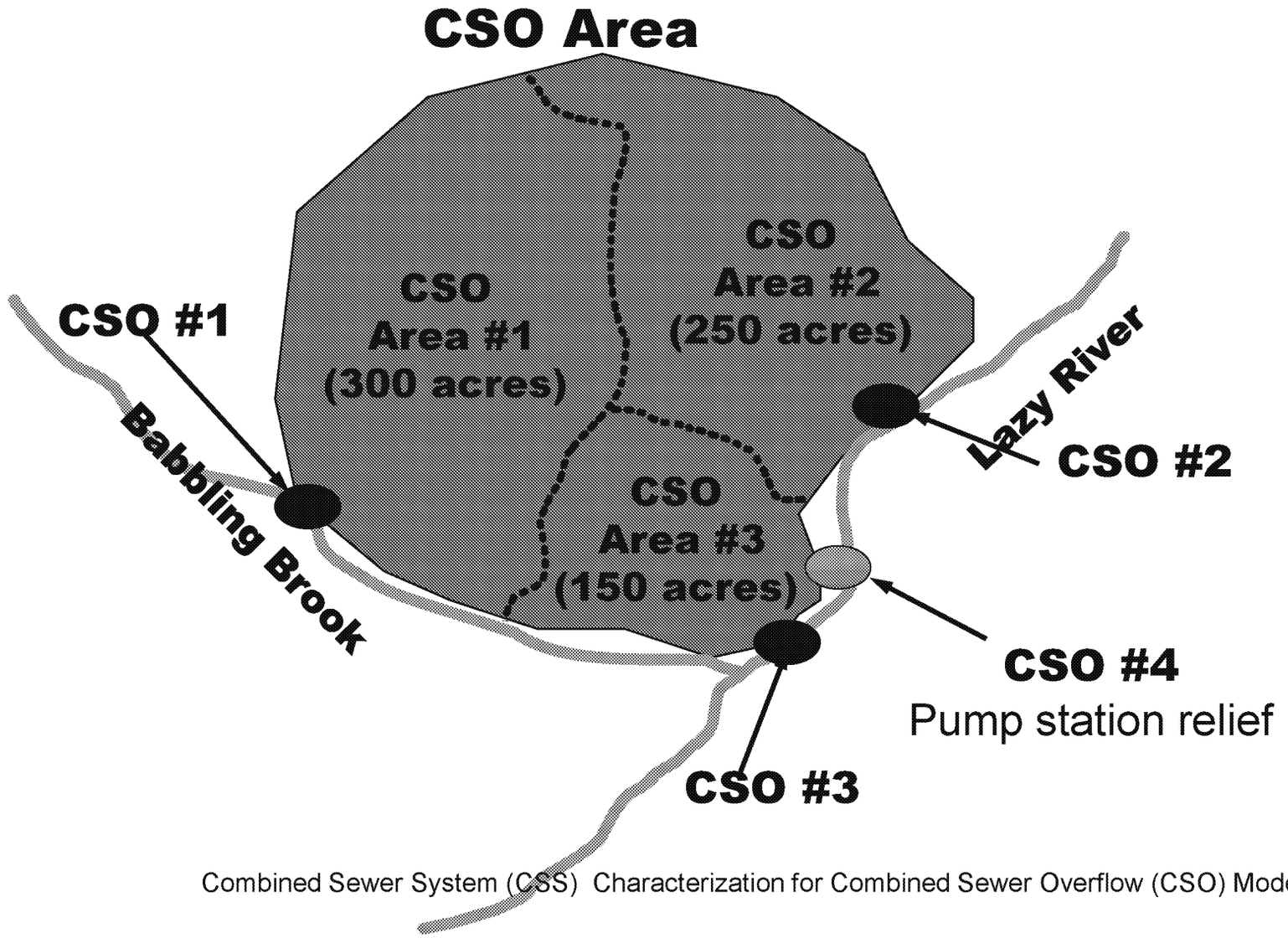


Overview of Collection System

- Layout of major interceptors
- Location of:
  - WWTP
  - CSO Regulators
  - Pump Station
  - Outfall Locations



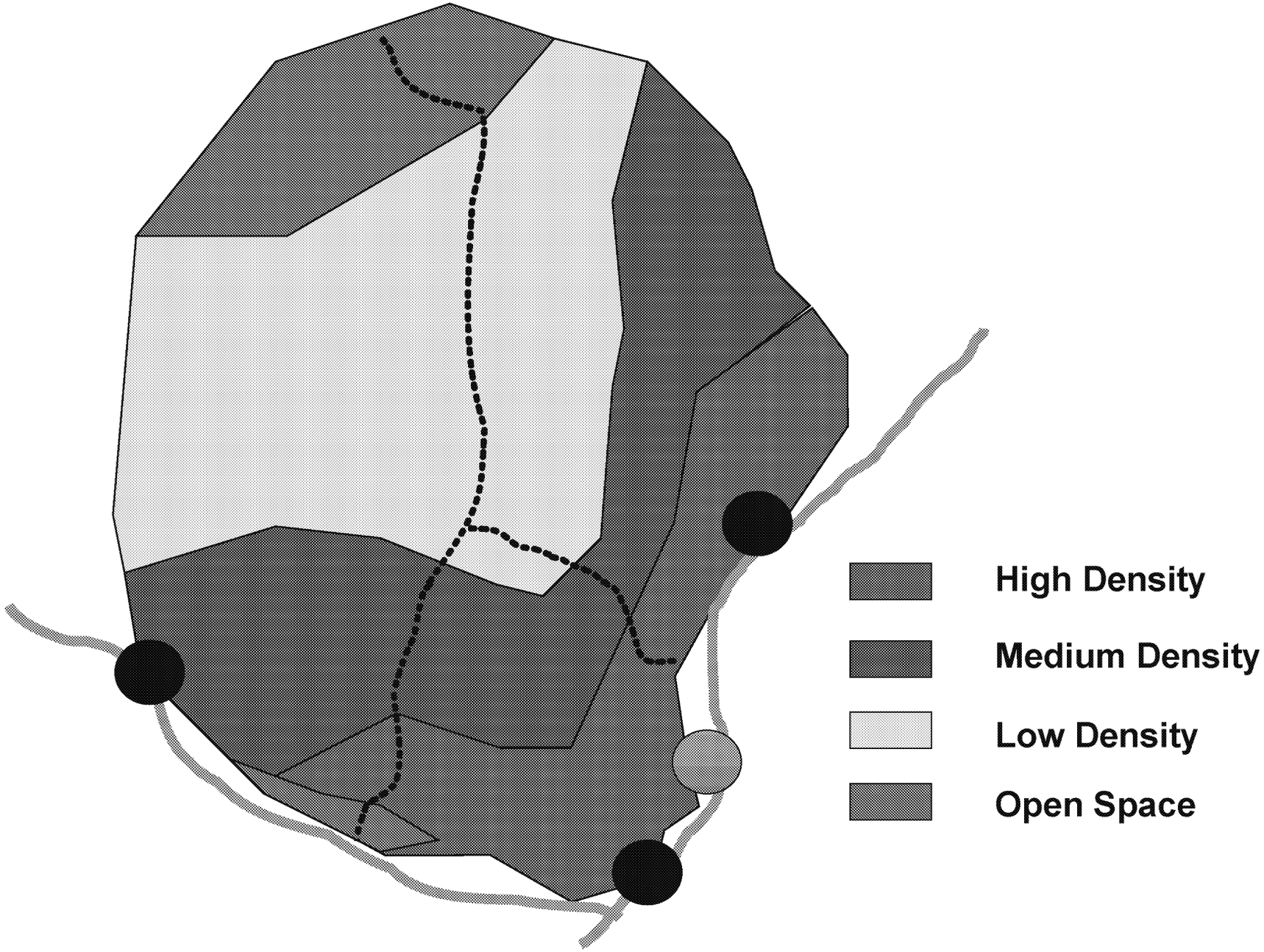
Defining Sub-Sewershed Areas



Characterizing Land Use

- General land use and estimated impervious cover
  - Some data available from USGS http://edc.usgs.gov/products/landcover/lulc.html#description
- Land use categories include:
  - Parkland or open space (<5% impervious)
  - Low density development (5-35% impervious)
  - Medium density development (35-70% impervious)
  - High density development (>70% impervious)

- The physical characterization is more than pipes and pumps. We need to know what is happening at the surface of the earth because that is where rainfall –produced runoff is generated, and the entry of this runoff into the CSS is what causes CSO problems
- We need to know land use and impervious cover
- Impervious cover is very important because just about all of the rain that falls on impervious cover becomes runoff and enters the CSS



Tabulating Land Use - Example

	Parkland/ Open Space	Low Density Development	Medium Density Development	High Density Development
CSO Area #1	25%	40%	25%	10%
CSO Area #2	10%	25%	45%	20%
CSO Area #3	5%	15%	30%	50%

Impervious Cover Calculation

25% park (3% impervious)	**0.8%**
40% LDD (25% impervious)	**10.0%**
25% MDD (50% impervious)	**12.5%**
10% HDD (75% impervious)	**7.5%**
Estimate of Impervious Cover:	**30.8%**

Example: CSO Area #1 includes:

Pipe, Capacity, & Flow Information

- Hydraulic analysis should be sufficient to:
  - ➢Establish capacities for WWTP, pump stations and CSO regulators
  - ➢Quantify dry weather and wet weather flows, including flows to CSS from neighboring communities
  - ➢Describe any existing flow metering
    - ✓Permanent system meters and monitors such as SCADA (Supervisory Control And Data Acquisition)
    - ✓Metering/flow monitoring from previous studies
  - ➢Identify problem areas and bottlenecks

Springfield: Pump Station and WWTP Capacities (MGD)

WWTP	**Average daily flow rate**	**4.0**
	▸ **CSS area**	**2.5**
	▸ **Separate sewer area**	**1.0**
	▸ **Satellite communities**	**0.5**
	Primary treatment capacity	**12.0**
	Secondary treatment capacity	**6.0**
Pump Station	**Average daily flow rate**	**3.0**
	Maximum pump rate	**6.0**